Patent claims

1. Low-coherence interferometric apparatus for light-optical scanning of an object (18), by detecting the position of light-remitting sites (20) which are located along a scan path (27) running in a scan direction (28),

with a low-coherence interferometer (6) comprising a low-coherent light source (7), a reference reflector (21) and a detector (25), wherein

- light emitted from the light source (7) is split by a beam divider (10) into two optical paths (11,12), and a first fraction of the light is irradiated as measurement light (16) onto the object and reflected at a light-remitting site (20) located at a variable scan position on the scan path (27), and a second fraction of the light is irradiated as reference light (22) onto the reference reflector (21) where it is reflected,
- the adjustable scan position is varied along the scan path (27) to perform a scan, and
- the measurement light (16) and the reference light (22) are combined at a beam junction (10) in such a manner that the resulting detection light (24), upon striking the detector, generates an interference signal which contains information about the reflection intensity of the measurement light relative to the respective scan position,

characterized in that

a variable wavelength selection device (30) is positioned in the light path of the detection light between the beam junction (10) and the detector (25), by which a wavelength-dependent selection of the detection light (24) is performed in such a manner that the detector (25) selectively receives preferably light with wavelengths which correspond to a predetermined sequence of wavenumbers k, and

different sequences of wavenumbers k can be set for varying the scan position along the scan path (27).

2. Apparatus according to claim 1, characterized in that, in the spectral range of the light source (7), the optical dispersion in the light paths of the measurement light (16) and the reference light (22) is essentially the same and the sequence of wavenumbers k is equidistant.

3. Apparatus according to claim 1, characterized in that, in the spectral range of the light source (7), the optical dispersion in the light path of the measurement light (16) differs from the optical dispersion in the light path of the reference light (22) and the sequence of wavenumbers k deviates in such a manner from an equidistant sequence that the dispersion difference is compensated.

4. Apparatus according to any one of the preceding claims, characterized in that the variable wavelength selection device (30) comprises

a spectral separation device (31) by which the detection light (24) is spatially separated, dependent on the wavelength of the detection light (24),

a spatial light selection device (38) having, alternating along a line, light passage areas (39) with lower light attenuation and light blocking areas (40) with higher light attenuation, the detection light (24) passing with less attenuation through the light passage areas (39) than through the blocking areas (40), and

an optical imaging system (34,35) by which light irradiated from the spectral separation device (31), is focused upon the spatial light selection device (38),

wherein the spreading of the wavelength-dependent separation of the detection light (24) by the spectral separation device (31) and the distance of the alternating passage and blocking areas (39,40) of the light selection device (38) are variable relative to each other for setting the sequence of wavenumbers k.

5. Apparatus according to claim 4, characterized in that the angular dispersion of the wavelength-dependent light separation by the spectral separation device (31) is constant and the distance of the alternating light passage and blocking areas (39,40) of the light selection device (38) is variable.

6. Apparatus according to claims 4 or 5, characterized in that the spectral separation device (31) comprises an optical grating (32).

7. Apparatus, according to any one of claims 4 to 6, characterized in that at least one optical element 60 of the optical imaging system (36) is simultaneously a component of the spectral separation device (31).

8. Apparatus, according to any one of claims 4 to 7, characterized in that the spatial light selection device comprises a reflective optical element (43), upon which the detection light (24) is irradiated and which selectively provides different reflection in the light passage areas (39) and in the blocking areas (49).

9. Apparatus according to any one of the preceding claims, characterized in that the light selection device (38) comprises a rotatable disk (54,56) with light passage and blocking areas (39,40) in the form of stripes, running in such a manner that a distance thereof, measured along a line (55) extending over the disk surface, changes during rotation of the disc (54,55).

10. Apparatus according to any one of the preceding claims, characterized in that the spatial light selection device (38) comprises an optical element (42,43,59) having a reflection or transmission which can be selectively adjusted in different partial areas thereof by electronic means.

11. Apparatus according to any one of the preceding claims, characterized in that a light-collecting optical element (49) is positioned in the light path of the detection light (24) between the light selection device (38) and the detector (25), in order to concentrate the detection light (24) on the detector (25).